

Interactive comment on “Measuring currents, ice drift, and waves from space: the Sea Surface KInematics Multiscale monitoring (SKIM) concept” by Fabrice Ardhuin et al.

Anonymous Referee #2

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This paper describes the concept of a space mission that will utilize the Doppler shift of radar returns to measure the ocean surface velocity, wave parameters, and sea ice drift. However, the small incidence angle of 12 degrees is highly undesirable for meeting the main mission objectives of ocean surface velocity, as well as sea ice drift for the following reasons:

1. Any measurement errors would be amplified by a factor of $1/\sin(12\text{ degrees})$, or ~ 4.8 .
2. The Doppler shift is heavily contaminated by the radial motions of the waves. The correction for wave bias is very strenuous without much assurance.

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3. The narrow swath makes the revisit time at a given location insufficient to sample the high-frequency motions like inertial currents and tidal currents that would overwhelm the low-frequency ocean currents that are the mission's main objectives. As noted in the paper, more than daily revisit will take place only at latitudes higher than 75 degs. The coverage of SKIM over time scales of 1' and 1 " in Fig 1 is way overstretch.

Although the mission would take advantage of the spare parts of the SWIM instrument, they impose the limitation on the incidence angle and therefore are really a wrong choice for meeting the mission science objectives. This is somewhat like using the spare parts of a cheap ordinary car to build a sports car hoping to win the Formula One race. The mission might serve the role of demonstrating the technique, but it is highly unlikely that the mission would advance the knowledge of ocean surface circulation.

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